

Work Order ID 78468

\*78468\*

Page 1

January-10-12 9:50:13 AM

Ship  
JAN 25

Item ID: D206-667-207BL

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Stop \*NS2\*

Item Name: Crosstube Mid Aft

Start Date: 10/01/2012 Start Qty: 1.00

\*1\*

Required Date: 25/01/2012 Req'd Qty: 1.00

\*1\*



Cust Item ID:

Customer:

Reference:

Approvals: Process Plan: M.C.J

Date: 12/01/10 Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start \*NR1\*

Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
----------	--------------

D206-667-247	A (DEO)
--------------	---------

IIN-D206-667	D
--------------	---

100

0.00

\*100\*

DC

Document Control

DOCUMENT CONTROL

Memo

0.00

Photocopy bluefile and create labels as per PPP D206-667-207 chg 002

12-1-25  
12/1/11

110

0.00

\*110\*

CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

0.00

Bend tube as per Dwg D206-667-247 using CNC bender program D206-667-207

MO  
12/1/11

Pho-7

Dart Aerospace Ltd

W/O: 78468		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D206-667-207BL PAR #:   Fault Category: X-tube NCR: Yes No   DQA:   Date: 12/1/25  
 Resolution: use as is Disposition: use as is QA: N/C Closed:   Date: 12/1/25

NCR: 12-1158		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.01.13	110	Measured 7.34% CRUSHING IN AREA AT END OF BEND. WD1 = 2.283 WD2 = 1.973	GP 12.01.13 PS/042	Acceptable based on attached S.R.	n/a	S 12/01/17	GP 12.01.13 PS/042	S 12/01/17

NOTE: Date & initial all entries

# Work Order ID 78468

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January-10-12 9:50:13 AM

Item ID: D206-667-207BL

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID:

Stop

**\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 10/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 25/01/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

120

QC15- Crosstube Dimensional Check

0.00

**\*120\***

QC

Memo

0.00

Quality Control

*8/26/17*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 78468

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Item ID: D206-667-207BL  
 Revision ID:  
 Item Name: Crosstube Mid Aft  
 Start Date: 10/01/2012 Start Qty: 1.00 \*1\*  
 Required Date: 25/01/2012 Req'd Qty: 1.00 \*1\*  
 Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description
170	Outsource process - NDT per QSI038 4.1
<b>*170*</b>	
Outsource2	<b>Memo</b>
Outsource process - NDT	Liquid Penetrant Inspection as per QSI C Issue P/O: 15926 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to w
180	Packaging
<b>*180*</b>	
Packaging	<b>Memo</b>
Packaging	Ensure copy of NDT results attached to
190	QC5- Inspect part completeness to step on W/O
<b>*190*</b>	
QC	<b>Memo</b>
Quality Control	Ensure results are as per Dwg D206-667

# Work Order ID 78468

January-10-12 9:50:13 AM

Item ID: D206-667-207BL  
 Revision ID:  
 Item Name: Crosstube Mid Aft  
 Start Date: 10/01/2012 Start Qty: 1.00 \*1\*  
 Required Date: 25/01/2012 Req'd Qty: 1.00 \*1\*  
 Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours
130	Crosstubes	0.00
<b>*130*</b>		
Crosstubes	<b>Memo</b>	0.00
Crosstubes	1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 and drill table DT8577 and tower holes #6 as per QSI0010 and as per Dwg D206-667-247. Drill all (3) top holes.	
	2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D206-667-247 Check dimensions between holes on all four sides.	
	3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.	
	4-Drill pilot holes using drill Jig DT 8584 & DT8583 as per Dwg D206-667-247. Drill only the top (2) holes.	
	5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D206-667-247	
	6-Drill Fwd rivet holes using drill Jig DT8787 as per Dwg D206-667-147.Note: Fwd side has 3x top holes.	
	7-Drill Aft rivet holes using drill Jig DT 8787 as per Dwg D206-667-247.	
	8-C'sink holes as per Dwg D206-667-247.	
	9 -Scribe part # and batch # using vibrating stylus as per Dwg D206-667-247 Inside of Cuff(Donot engrave on outside of tube)	
	10 -Deburr & Inspect for surface damage. Repair damage within limits as per	

**\*78468\***

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Accept **\*N900040100\*** Setup Start **\*NS1\***  
 Stop **\*NS2\***  
 Cust Item ID:  
 Customer:

Run Start **\*NR1\***  
 Stop **\*NR2\***

Tool ID Tool # Plan Accept Reject Reject Insp.  
 Code Qty Qty Number Stamp

Handwritten notes and signatures:  
 A large handwritten 'X' is drawn across the right side of the page.  
 Signature: JW  
 Date: 12/1/12  
 Signature: MO  
 Date: 12/1/13

Dart Aerospace Ltd

W/O:		
DATE	STEP	PROCEDURE

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_  
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)	
DATE	STEP	Description of NC Section A	Initial
			Chief Eng

NOTE: Date & initial all entries

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_  
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

# Work Order ID 78468

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January-10-12 9:50:13 AM

Item ID: D206-667-207BL Accept **\*N900040100\*** Setup Start **\*NS1\***  
 Revision ID: Stop **\*NS2\***  
 Item Name: Crosstube Mid Aft  
 Start Date: 10/01/2012 Start Qty: 1.00 **\*1\*** Cust Item ID:  
 Required Date: 25/01/2012 Req'd Qty: 1.00 **\*1\*** Customer:  
 Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200	SprayPaint	0.00							
<b>*200*</b>									
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME:								
	Start Time: 6 00								
	Finish Time: 7 00								
	PAINT:								
	Start Time: 11 00								
	Finish Time: 12 00								
210	QC14- Inspect Spray Paint	0.00							
<b>*210*</b>									
QC	Memo	0.00							
Quality Control	Wrap in plastic bag to protect from scratches								

85 12-01-19  
 12-01-23 (1)

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_  
 Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



**Work Order ID 78468****\*78468\***

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January-10-12 9:50:13 AM

Item ID: D206-667-207BL

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID:

Stop

**\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 10/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 25/01/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

220

0.00

**\*220\***

Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Install nut plates as per Dwg D206-667-247.

AS 12-01-24

230

0.00

**\*230\***

Skidtubes

Crosstubes

Memo

0.00

Crosstubes

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper,  
clean the area with 410SS wash 'n' wipe

2-Install supports with Proseal 890 per DSI9565 and QSI 015

A/R Proseal 890 Batch: 120072

3- Torque bolts as per dwg

AS 12-01-23

240

QC5- Inspect part completeness to step on W/O

0.00

**\*240\***

QC

Memo

0.00

Quality Control

81761125

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 78468****\*78468\***

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January-10-12 9:50:13 AM

Item ID: D206-667-207BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 10/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 25/01/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan: \_\_\_\_\_

Date: \_\_\_\_\_

Tooling: \_\_\_\_\_

Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_

Date: \_\_\_\_\_

SPC (Y/N): \_\_\_\_\_

Date: \_\_\_\_\_

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

250

Pick Kit

0.00

**\*250\***

Packaging

Memo

0.00

Packaging

12/1/25

260

QC4- 100% Inspect kits for completeness

0.00

**\*260\***

QC

Memo

0.00

Quality Control

12-01-25 (1)

270

Packaging

0.00

**\*270\***

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D206-667-207

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

Sp 12-08-25

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 78468****\*78468\***

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January-10-12 9:50:13 AM

Item ID: D206-667-207BL

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID:

Stop

**\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 10/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 25/01/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00

**\*280\***

QC

Memo

0.00

Quality Control

12/11/25 *[Signature]*  
*MF*  
12-01-25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

January-10-12 9:50:16 AM

Page 1

Work Order ID: 78468

\*78468\*

Parent Item: D206-667-207BL

\*D206-667-207BL \*

Parent Item Name: Crosstube Mid Aft

Start Date: 10/01/2012

Required Date: 25/01/2012

Start Qty: 1.00

Required Qty: 1.00

Comments:

RevA 11.01.13 New Issue EC verified by:DD  
11.08.08 PER ECN 11-615 DD VERF:EC

IPP REV:B

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D206-667-247TRN

Manufactured

No

110

Each

2.0000

1

1

\*D206-667-247TRN\*

\*\*

Crosstube Assembly, Mid Aft

Location

Loc Qty

Loc Code

LG

2

69982

1

69983

1

D2873-043

Manufactured

No

220

Each

34.0000

2

2

\*D2873-043\*

\*\*

Nut Plate Assembly

Location

Loc Qty

Loc Code

LG052

34

72644

2

73605

12

75010

20

D2873-045

Manufactured

No

220

Each

27.0000

2

2

\*D2873-045\*

\*\*

Nut Plate Assembly

Location

Loc Qty

Loc Code

LG052

27

73529

7

74985

20

12-1-11

12-1-24

12-1-24

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

**Part No:** \_\_\_\_\_ **PAR #:** \_\_\_\_\_ **Fault Category:** \_\_\_\_\_ **NCR: Yes No** **DQA:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Resolution:** \_\_\_\_\_ **Disposition:** \_\_\_\_\_ **QA: N/C Closed:** \_\_\_\_\_ **Date:** \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Work Order ID: 78468

**\*78468\***

Parent Item: D206-667-207BL

**\*D206-667-207BL \***

Parent Item Name: Crosstube Mid Aft

Start Date: 10/01/2012

Required Date: 25/01/2012

Start Qty: 1.00

Required Qty: 1.00

MS20601-AD4W10

Purchased

No

220

Each

165.0000

14

14

**\*MS20601-AD4W10\***

**\*\***

RIVET

Location

Loc Qty

Loc Code

LG051

165

118675

65

119386

100

14

AR 12-1-24

D2892-1

Manufactured

No

230

Each

18.0000

2

2

**\*D2892-1\***

**\*\***

Support

Location

Loc Qty

Loc Code

LG052

18

72483

14

72585

4

2

AR 12-01-23

D3595-063-450

Manufactured

No

230

Each

74.1095

4

4

**\*D3595-063-450\***

**\*\***

RUBBER CUSHION

Location

Loc Qty

Loc Code

MAT052

74.109474

67353

2

68893

6

70113

0.56

71354

0.2

74113

0.349474

75597

65

4

AR 12-01-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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Work Order ID: 78468

Parent Item: D206-667-207BL

Parent Item Name: Crosstube Mid Aft

**\*78468\***

**\*D206-667-207BL \***

Start Date: 10/01/2012

Required Date: 25/01/2012

Start Qty: 1.00

Required Qty: 1.00

MS21920-22

Purchased

No

230

Each

76.0000

4

4

**\*MS21920-22\***

Clamp(per MIL-DTL-8783C)

\*\*

Location

Loc Qty

Loc Code

LG

50

119545

50

LG050

26

116207

7

117506

1

118186

18

AN5-10A

Purchased

No

250

Each

634.0000

10

**\*AN5-10A\***

Bolt

\*\*

Location

Loc Qty

Loc Code

ST337

634

118191

80

119547

454

119981

100

AN5-32A

Purchased

No

250

Each

215.0000

4

4

**\*AN5-32A\***

Bolt

\*\*

Location

Loc Qty

Loc Code

ST339

215

118422

2

118628

38

118983

25

119328

100

119862

50

January-10-12 9:50:16 AM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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# Picklist Print

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Work Order ID: 78468

**\*78468\***

Parent Item: D206-667-207BL

**\*D206-667-207BL \***

Parent Item Name: Crosstube Mid Aft

Start Date: 10/01/2012

Required Date: 25/01/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-34A Purchased No

250 Each

64.0000 4 4

**\*AN5-34A\***

\*\*

Bolt

Location

Loc Qty

Loc Code

ST339

64

117794

34

119328

30

AN960JD516 NAS1149D0563J Purchased No

250 Each

0.0000 18 18

**\*AN960JD516\***

\*\*

Washer

MS21042L5

Purchased No

250 Each

2,022.000 4 4

**\*MS21042L5\***

\*\*

Nut

Location

Loc Qty

Loc Code

ST300

2022

116105

5

116548

43

117611

50

118179

424

119109

1500

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

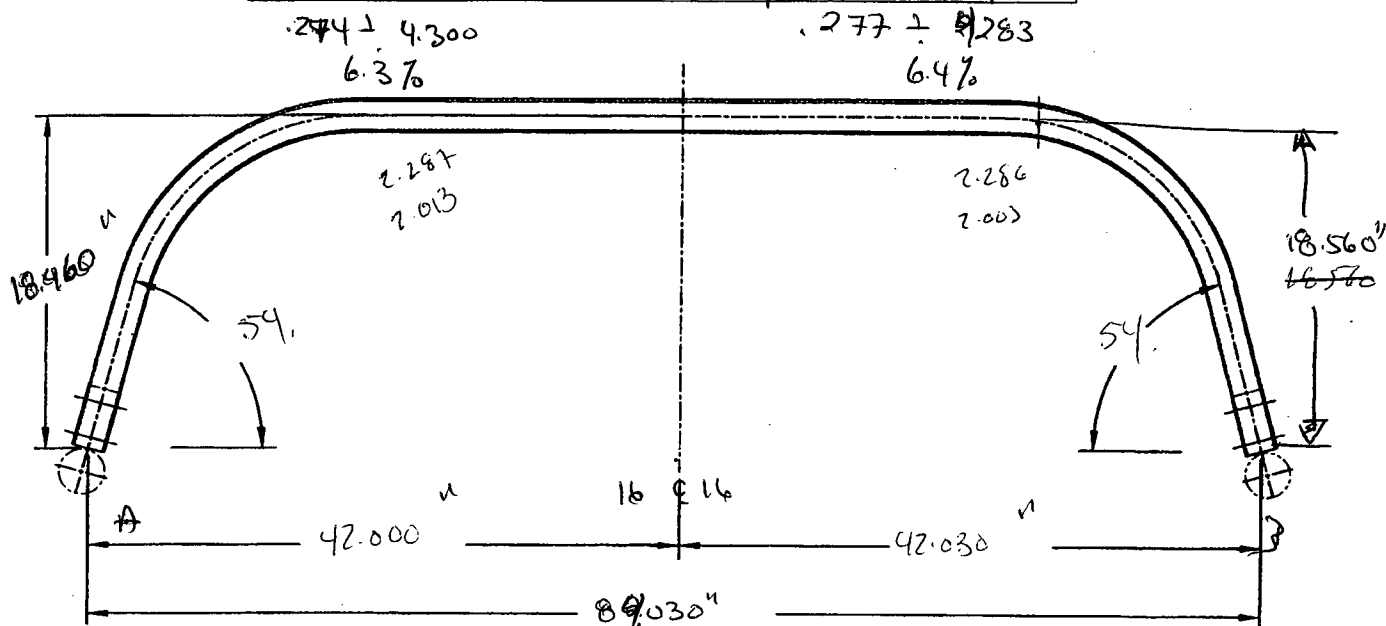
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DART AEROSPACE LTD		Work Order:	78468
Description:		Part Number:	P296-667-207
Inspection Dwg:		Rev:	
			Page 1 of 1

Required Dimension	Min	Max
±.130 Height 18.47	18.34"	18.60"
±.130 1/2 Span 41.92	41.79"	42.05"
±2° Angle 54	54.0°	56.0°
±.260 Total Span 83.84	83.59	84.09"



Comments
Side A = 6.3% crush @ 66 Passes
Side B = 6.4% crush @ 16 Passes

QC15 Inspection	8
Date	12/11/17

Rev	Date	Change	Revised by	Approved
A		New Issue		
B	06.09.19	Reformat; QC level revised	KJ/JM	
C	07.02.06	Reformat	KJ/JM	

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Item	Qty	Part Number	Description
	-247		
1	X	D206-667-247	CROSSTUBE ASSEMBLY (206L MID AFT)
2	1	D6004-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2892-1	SUPPORT
6	4	D3595-063-450	RUBBER CUSHION
7	4	MS21920-22	CLAMP
8	14	MS20601AD4W10	RIVET (OR NAS9302B-4-10)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299- 947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6004-115  
FINISHED LENGTH = 99.76±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-247" AND BATCH NUMBER ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS).
- 7) WEIGHT: 21.1 lbs (-607 = 17.7 lbs)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 10 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2892-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-22 CLAMPS WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2892-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO APPROVAL

WITHDRAWN  
WORK ORDER  
NO. 38468 M.C.J.  
12/01/10

DEO ATTACHED

ECO #11-615  
11.07.28

UNDER REVIEW

RELEASED  
2011-05-24

A	NEW ISSUE	CP	10.12.23
REV	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.12.23		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D206-667-247	REV. A SHEET 1 OF 4
TITLE CROSSTUBE ASS'Y (206L MID AFT)	SCALE NTS
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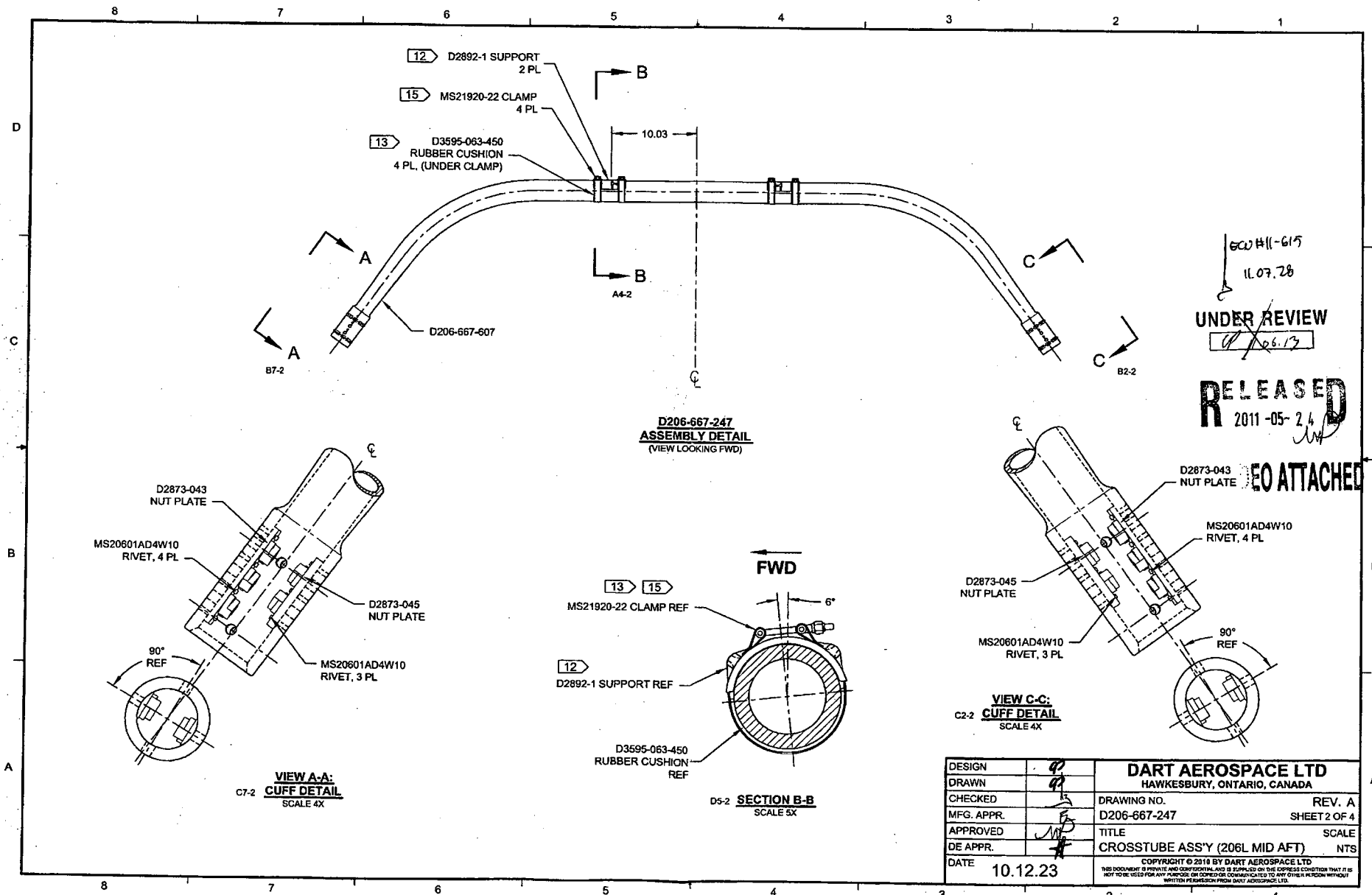
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**NOTE:** Date & initial all entries

78468



DESIGN	99	<b>DART AEROSPACE LTD</b>	
DRAWN	99	HAWKESBURY, ONTARIO, CANADA	
CHECKED	5	DRAWING NO.	REV. A
MFG. APPR.	5	D206-667-247	SHEET 2 OF 4
APPROVED	W	TITLE	SCALE
DE APPR.	#	CROSSTUBE ASS'Y (206L MID AFT)	NTS
DATE	10.12.23	COPYRIGHT © 2018 BY DART AEROSPACE LTD	
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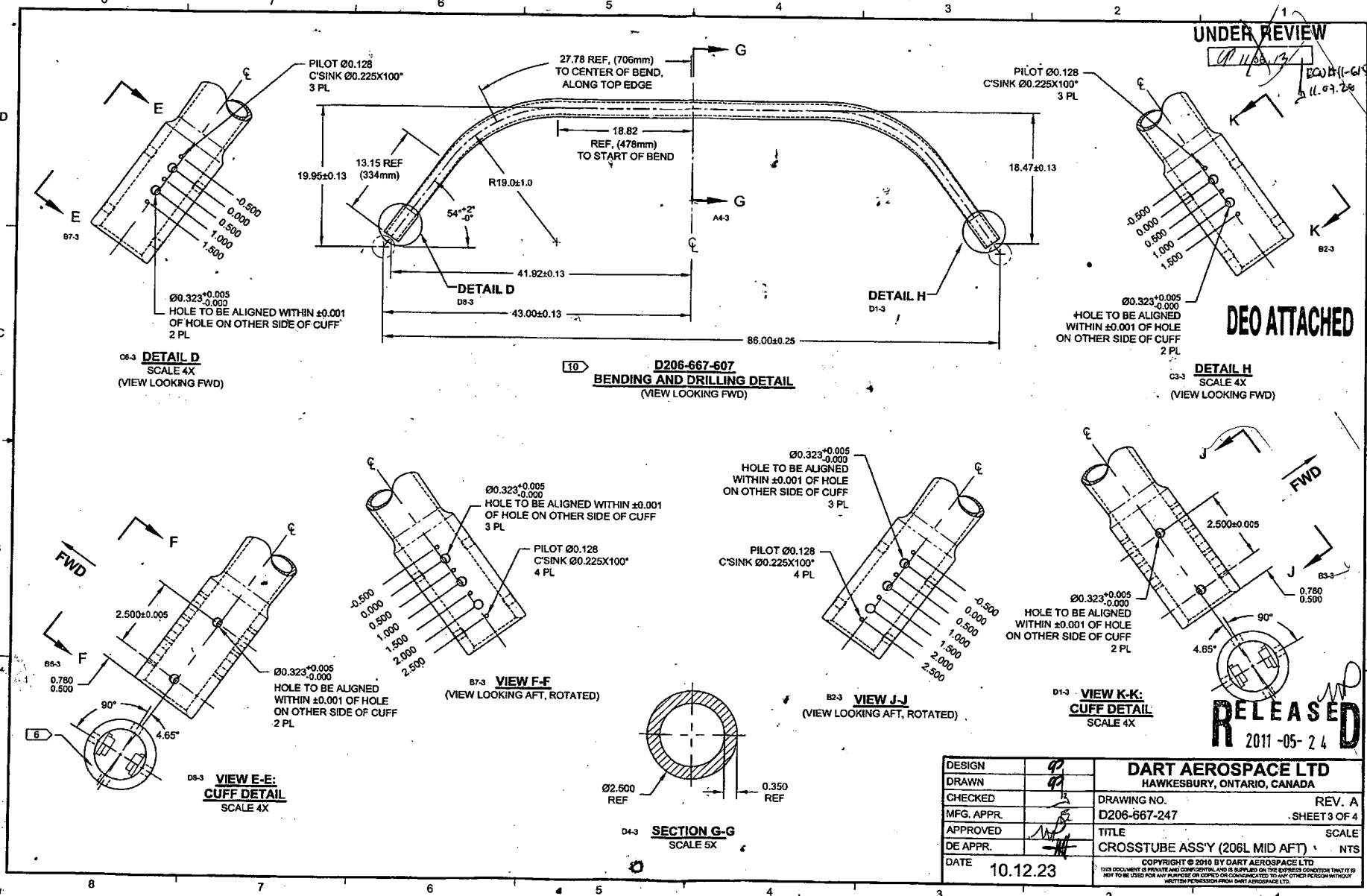
NOTE: Date & initial all entries

78468

UNDER REVIEW

DEO ATTACHED

RELEASED  
2011-05-24



DESIGN		DART AEROSPACE LTD
DRAWN		HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. REV. A
MFG. APPR.		D206-667-247 SHEET 3 OF 4
APPROVED		TITLE SCALE
DE APPR.		CROSSTUBE ASSY (206L MID AFT) NTS
DATE	10.12.23	

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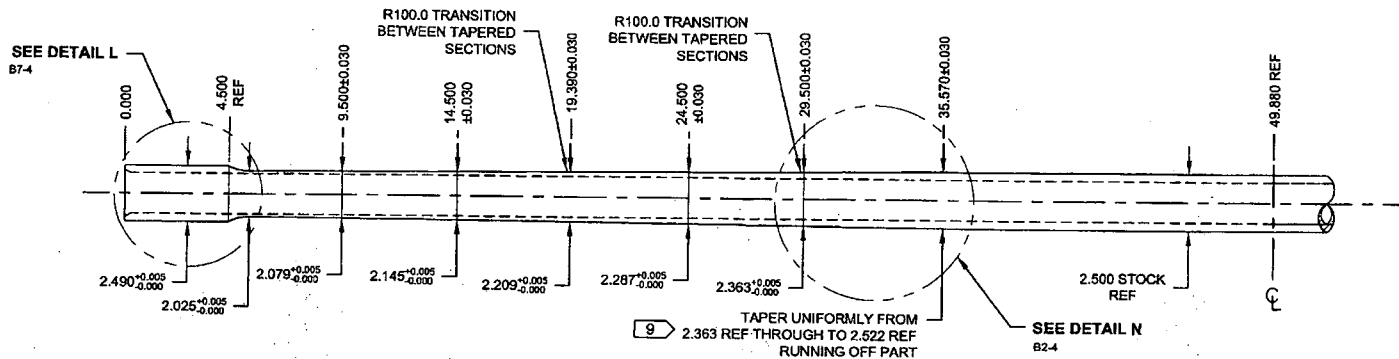
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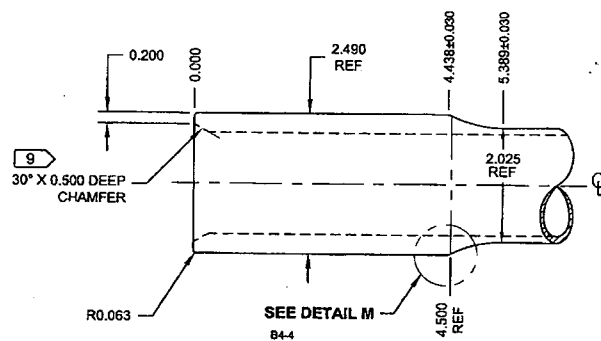
**NOTE:** Date & initial all entries

78468

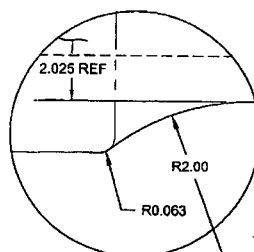


SCW #11-615  
11.07.28  
11.06.13  
**UNDER REVIEW**

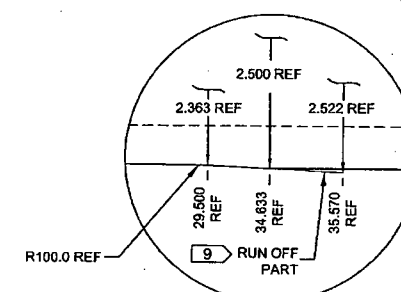
**DEO ATTACHED**



C7-4 **DETAIL L: CROSSTUBE CUFF**  
SCALE 2.5X



B6-4 **DETAIL M: CUFF TRANSITION**  
NOT TO SCALE



C4-4 **DETAIL N: TAPER RUN-OFF**  
NOT TO SCALE

**RELEASED**  
2011-05-20

DESIGN	9	<b>DART AEROSPACE LTD</b>	
DRAWN	9	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D206-667-247	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (206L MID AFT)	NTS
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78468

DRAWING NO. D206-667-247	TITLE CROSSTUBE ASS'Y (206L MID AFT)	REV. A	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>		D.E.O. NO. D206-667-247-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>qp</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>KB</i>	APPROVED <i>AMP</i>		DE APPR. <i>HA</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.7.21		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL.

**CHANGE:**

IS:

Item	Qty -247	Part Number	Description
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
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NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

12) TO INSTALL D2892-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

12) INSTALL D2892-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED  
2011-07-28  
*W*

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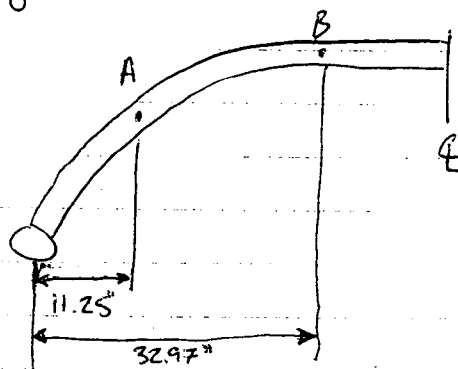
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12.01.13

# CRUSHING OF D206-667-247

Acceptability of 8% CRUSHING AT END OF BEND



Point A:  $OD_1 = 2.283$   $OD_2 = 1.973$

$$CRUSHING = (2.283 - 1.973) / ((2.283 + 1.973) / 2) = 7.3\%$$

$I = 0.435 \text{ in}^4$  FROM AUTOCAD

Point B:  $OD = 2.50 \text{ in}$   $ID = 1.80 \text{ in}$

$$I = 1.402 \text{ in}^4$$

$$A: F = M c / I = P \times 11.25 \times 1.973 / 2 \times 0.435 = 13.52 P$$

$$B: F = P \times 32.97 \times 2.50 / 2 \times 1.402 = 29.39 P$$

$$M.S. = 29.39 / 13.52 - 1 = 1.17$$

∴ Tube will break at support before area of 8% crushing. 8% crushing in area at end of bend is acceptable.

CP 12.01.13



## LIQUID PENETRANT TEST REPORT

P- 12250-

PAGE 1 OF 1

CLIENT DAT Aerospace DATE JAN 18 2012 TIME 4 AM ☒ AM ☐ PM ☐  
ATTENTION CHARTAL ACUREN JOB NO. 128-12-C0010  
ADDRESS 1270 ABERDEEN ST. PO/WO No. -  
HAWKES BURY ONT. WORK LOCATION SAME  
ACCEPTANCE STD. ASTM 1417/OSI-08 REV./DATE 2005  
PROJECT F.P.E. on CROSS TUBES  
ITEM(S) EXAMINED (10) UNITS

JOB DESCRIPTION PROCEDURE NO. LT 0002 REV./DATE 2008 TECHNIQUE NO. LT 1542 REV./DATE 2008  
PART NO. SEE RESULTS MATERIAL ALUMINE ALUMINUM THICKNESS VARIABLES  
SCOPE A WET FLOUORESCENT LIQUID PENETRANT INSPECTION  
CARRIED OUT ON 100% EXTERNAL SURFACE

## TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND ZYGO - MAGNAFLUX BLACK LIGHT S/N 16459 ☒ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT ZL 67 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO  
DEVELOPER SKDS2 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE FEB 2  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY 2012

## TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < - 4°C/ 20°F ☐ - 4°C/ 20°F TO 10°C/50°F ☐ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- ☒ METRIC ☐ IMPERIAL

1 - CROSS TUBE W.O. 78464 ✓  
1 - CROSS TUBE W.O. 78463 ✓  
1 - CROSS TUBE W.O. 75806 ✓  
1 - CROSS TUBE W.O. 75805 ✓  
1 - CROSS TUBE W.O. 78677 ✓  
1 - CROSS TUBE W.O. 78675 ✓  
1 - CROSS TUBE W.O. 78468 ✓  
1 - CROSS TUBE W.O. 78679 ✓  
1 - CROSS TUBE W.O. 78676 ✓  
1 - CROSS TUBE W.O. 78946 ✓

206 447 20784

← WAS REFOUND IN ONE AREA

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE Andrew Sheldon PRINT ASheldon SIGNATURE DTR # E-96923  
TECHNICIAN (SIGNATURE): M.KE. Johnston REPORT REVIEWED BY:  
NAME (PRINT): M.KE. Johnston NAME INITIALS  
1<sup>ST</sup> TECHNICIAN 2<sup>ND</sup> TECHNICIAN  
CGSB LEVEL II SNT LEVEL II CGSB LEVEL SNT LEVEL  
CGSB REG. No 6606 CGSB REG. No